

## RADON RISK COMMUNICATION IN BULGARIA

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**The main purpose of this paper is to analyse the activities for Radon Risk Communication under the National Radon Program and to outline the main objectives in the new Radon Action Plan for developing a communication strategy. The preliminary activities were implemented under the National Radon Program. Survey via the Internet for assessment of perceptions and the level of knowledge regarding radon was conducted as a benchmark for evaluation of public awareness. The main channels which were used to inform the population were publications on websites, magazines, in TV interviews and radio (local), seminars, from which the most widely used were local seminars. On the basis of this, six objectives are proposed for a new radon action plan: to obtain wide organisational support and to determine the need of risk communication; to develop goals for risk communication with key messages to different target groups; to form and to train the communication team; to evaluate the stakeholders and the communication channels; to develop plans with different organisations for different focus groups; to evaluate the radon risk communication programme.**

### INTRODUCTION

Radon risk communication (RRC) is an important task of the National strategy for measurements and actions to reduce indoor radon concentration and also one of the main challenges. Effective risk communication involves two parts: information about the risk and the exchange process. Radon is the number one cause of lung cancer among non-smokers, recognised by IARC since 1988<sup>(1)</sup>. Epidemiological studies have provided convincing evidence of an association between indoor radon exposure and lung cancer, even at the relatively low radon levels commonly found in residential buildings<sup>(2)</sup>. The mission of the radon communication strategy is to give information about the harmful factor, the ways of measuring and reducing the concentration of radon in buildings, and to improve the air quality in them<sup>(3)</sup>. Many social and psychological factors influence how people perceive risks<sup>(4)</sup>. The risk perception is strongly affected by distrust between the public and the communicators and uncertainties and knowledge gaps in the risk assessment<sup>(5)</sup>. Radiation risk communication is also confounded by the fact that the public's perception of radiation risk differs from that of the experts<sup>(6)</sup>. For example, Perko<sup>(6)</sup> confirmed that general public had higher perceptions of natural radiation, but lower perception of medical X-rays compared to the experts<sup>(6)</sup>. There are no systematic studies in Bulgaria on the radiation risk perception, but there is radiophobia related to previous incidents and poor communication. The communication of radon risk and prevention messages poses serious challenges, because radon is not widely known and may not be perceived as a health risk by the public. The RRC strategy main objectives are to raise

awareness of the radon risk, to encourage co-operation between organisations, to convey clear and coordinated messages, and to enlist collaborators with good community credibility<sup>(3)</sup>. Radon risk communication is an important component of a national radon strategy<sup>(3, 7)</sup> and should be addressed to the public and decision makers at local and national level.

Indoor radon is the dominant source of ionising radiation exposure to the Bulgarian population. Bulgaria recently adopted a National Program for the Reduction of Radon Impact on Residential Buildings on the Bulgarian Population which established the responsible organisations, action plans and framework.

The aim of this paper is to analyse the activities of the radon risk communication under the National Radon Program, to draw relevant conclusions and to outline further steps in Radon risk communication.

### MATERIALS AND METHODS

According to the definition by Covello, Slovic and Von Winterfeldt the risk communication is defined as any purposeful exchange of information about health or environmental risks between interested parties. More specifically, risk communication is the act of conveying or transmitting information between parties about (1) levels of health or environmental risks; (2) the significance or meaning of health or environmental risks; or (3) decisions, actions, or policies aimed at managing or controlling health or environmental risks. Interested parties include government agencies, corporations and industry groups, unions, the media, scientists, professional organisations, public interest

groups, and individual citizens<sup>(8)</sup>. The traditional approach to study and analyse risk communication is based on the communication model of information transfer among sources, transmitters, and final receivers. Another approach is the transactional view that emphasises the creation of shared meaning among senders and receivers<sup>(9)</sup>. In order to evaluate activities of radon risk communication both approaches were combined. A source–message–receiver model was used as a basis of the radon risk communication strategy. In order to evaluate the radon risk on the Bulgarian territory, a radon survey was carried out based on the National Radon Program. The messages of radon source and risk assessed by WHO<sup>(3)</sup> and previous countries experience<sup>(10)</sup> were adopted for the risk communication strategy in the brochures and information sheets etc.

### Monitoring and evaluation

The purpose of the monitoring is the periodic oversight of the implementation of activities to establish the extent of input data, work schedule and targeted output.

Rules that include appropriate tools (key indicators) have been developed to monitor and to evaluate the efficiency of each action and to achieve the objectives set in the national programme. Indicators represent a measure of achievement of priorities and should be: measurable and quantifiable (percentage, ratio, number); valid to everyone; verifiable; sensitive enough to reflect changes in the situation.

Key indicators were established to monitor radon risk communication, and they have been detailed to take in account the different communication channels. Such quantitative indicators were the number of publications on websites, magazines, TV and radio interviews, seminars. On the other hand the effectiveness of a communication campaign could be evaluated by the number (percentage) of households that volunteer to have their radon concentration measured and most importantly the number of those

found to have high concentration who take action to remediate their homes against radon<sup>(10)</sup>.

### Evaluation of the reception of information

The evaluation of the reception of information was planned considering the risk communication as a two-way exchange of information between those communicating information of the risk and those at risk. Radon Awareness Surveys (RAS) were used for evaluation of the reception of information, the awareness, and the level of knowledge regarding radon, to serve as a basis for future assessment. The survey was conducted via Internet mass communication channels. The questionnaire was prepared at the National Center for Radiobiology and Radiation Protection on the basis of the Radon Prevention and Remediation (RADPAR) Questionnaire<sup>(7)</sup>. The RAS was conducted in the beginning of the National program from 17 September to 3 October 2014.

## RESULTS AND DISCUSSIONS

Several steps were made to increase public knowledge of the risks related to radon exposure during the initial phase of the implementation. The activities, which were carried out for the communication strategy under the National radon program included:

- Creation of an identifiable logo.
- Development of a website of the National Program.
- Maintaining a Facebook page.
- Development and distribution of Brochures, Leaflets, Posters, etc.

A public website of the National Program for the promotion of the Programme was created. The requirement was to meet a diverse target audience—citizens, construction specialists, occupational medicine specialists, employers, print and electronic media.

During the implementation of the National Radon Program ~20 000 brochures have been distributed through Regional Health Inspectorates, which covers only 0.3% of households. Brochures and leaflets' use should be continued, but other channels such as schools, kindergartens, GPs, MDs, employers, etc. should be promoted, as established by the ICRP and by EU recommendations<sup>(7, 11)</sup>.

The activities carried out for 2015 are presented in Figure 1 per indicators. The most popular communication channel was local seminars, which could be explained with the task for distribution of detectors for National radon survey carried out at the same time. As a result, all risk communication channels were covered, noting the insufficient frequency of use. This could be explained by the fact that the problem of control and radon exposure reduction is

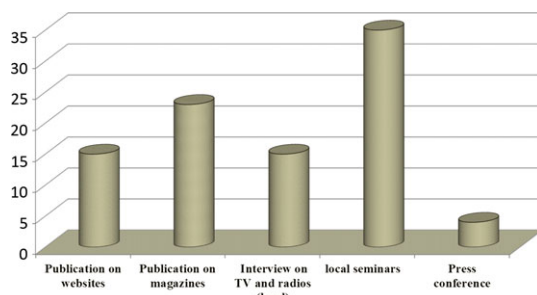


Figure 1. Number of performed activities per indicators.

still new for Bulgaria and during the first programme period more work has been done to train specialists in this field and to take measures for analysis of radon distribution on the Bulgarian territory.

The assessment of the effectiveness of the overall communication campaign during the period of the National Program could not be carried out in full, because the households willing to measure radon in their homes and reduce the concentration of radon were few. Recently an increase in the interest has been noted. Compared to Ireland, which has years of experience in the control and reduction of radon exposure, those wishing to reduce radon concentration in homes were 22% for 2015<sup>(12)</sup>. The study performed in Ireland showed, that a telephone call could be a factor in influencing households with high radon concentration to remediate the dwelling<sup>(10)</sup>. This indicates that radon risk communication is a complex and continuous work including a systematic analysis of all available channels and resources and it should be a major part of the National Strategy.

### Radon awareness survey

RAS is an essential component of a risk communication strategy both at the planning stage of communication campaigns and on a continuous basis. The results of the RAS are presented in Table 1. The results show that ~10 000 people visited the website of National Program. People visited the RAS webpage through Google more than Facebook channel. The next RAS have been planned to include other channels such as e-mail in order to reach more response.

The survey included questions on the following domains: knowledge of radon; health effects; radon measurement and control and stakeholder. RAS contains a question of the level of education of the people interviewed. The higher percentages of people answering the questions were with university education (above 80%).

The results of the answers to the question ‘Have you heard about the radioactive gas radon?’ show

**Table 1. Results from radon awareness survey carried out via internet (2014).**

Parameters	Results
Total number of impressions (banner views)	10 834 896
Total number of clicks (visits) per page	10 227
The Google Display Network (visits)	9348
Facebook channel (total releases publication)	879
Participants in the poll (people)	321
Answered all questions (people)	309
Responded in part (people)	12
Percent of people complete the questionnaire	3%

that 80% of respondents have heard about radon and 20% are not familiar. This high percentage of correct answers may be due to the fact that the people who volunteered to fill the questionnaire have a high level of education. But in fact only half of those 80% have a thorough understanding of the gas and the areas where it usually could be encountered. The answers of the questions related to health threat are presented in Table 2. The percentage of people who know the underlying health effects of radon exposure is high (77%) but have no correct understanding of the health problems which are possible to be induced by radon. Only 66% of people answering the questions know the correct answer about the health effects and 56% of them have known the connection between the health effects of radon and smoking.

One of the main aims of the performed questionnaire was to establish the level of public trust and credibility toward different communication channels when receiving information concerning health risks. The answers to the questions ‘If you have to measure radon in your home, who do you trust to do it?’ and ‘Who do you trust most in health matters?’ are specifically of interest as they contradict each other. Results of the answer to the second question are shown on Figure 2. While on the first question 80% of the respondents trust the state institutions and scientific organisations and only 20% of independent experts and private organisations, the second question has a major variation of responses. 56% of those surveyed have stated that they trust independent experts and Non-governmental organisations (NGOs). Only 5% have confidence in government institutions and scientific organisations.

Overall, this lack of confidence could be explained by the current global political situation in which we are seeing a growing distrust of state institutions as a whole. However, in the private case we are dealing with, we should be mainly concerned about the heterogeneity of the relayed messages and the requirement for a better organisation of work with the non-governmental sector and the independent experts in the field.

In general, the clear definition of target groups and targeted messages to these groups are a key factor in the success of the communication strategy. On the basis of the actions taken so far, an impact factor analysis of each action has been carried out, and a preference is being given to tasks that have proved their leverage effect.

Further work with NGOs, independent experts and the media are needed to achieve greater consistency and awareness of the activities and risks associated with the impact of radon. It should be noted that understandable messages are needed, as the general perception of the radionuclide exposure is incomprehensible to the general public.

**Table 2. Answers of questions related to health threat.**

Question and answers	Percentage
Do you think radon may harm your health?	
Yes, strongly	77
I have no idea	21
No, rather not	3
What health problems do you expect to be induced by radon?	
Lung cancer	66
Skin problems	11
Migraine	9
Heart disease	8
None	6
In your opinion, is there a link between health effects of radon and smoking?	
Yes	56
I have no idea	44
No	16
Comparing the radiation from radon with that from NPP Kozloduy—do you think that the harm to public health through radon is	
Higher	66
I have no idea	26
Almost the same	24
Less	10

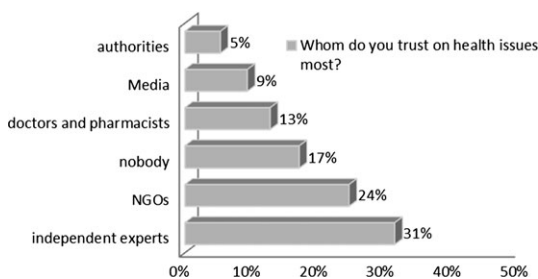


Figure 2. Results of the answer to the question: 'To whom do you have the greatest trust in health matters?'.

The knowledge and insight gained by RAS will be of assistance to the design of the campaign. A RAS should also be carried of the same target audiences after a communication campaign, to assess its effectiveness. This will be of assistance in improving any future campaigns.

## CONCLUSION

The paper reviews and analyses the activities carried out for radon risk communication during the period of the first National program. Some lessons learned, and several areas for future focus could be outlined:

- Health risk associated with radon exposure is incomprehensible to the general public.

- Clear separation of general and individual messages designed for each target group should be implemented.
- Specific seminars developed for different target groups should be applied.
- Considerable increase in active communication is needed in all channels, incl. extensive use of social networks.
- Steps to enhance the credibility in national radiation protection authorities should be taken.
- Increase of collaboration with social sciences specialists should be sought.
- Evaluation of radon risk communication programme and an impact factor analysis of each action have been carried out, and a preference is being given to tasks that have proved their leverage effect.

The effective risk communication requires the cooperation between organisations, clear and coordinated messages, and the engagement of speakers with good community credibility.

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